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10/563,116	04/14/2006	Katsunori Sakata	FP04001-US-P/MM/CT	1096

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MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
MOYER, DALE S	

ART UNIT	PAPER NUMBER
3664	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,116	SAKATA ET AL.	
	Examiner	Art Unit	
	Dale Moyer	3664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Application

1. In view of the APPEAL BRIEF filed on 22 December 2009, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/KHOI TRAN/

Supervisory Patent Examiner, Art Unit 3664

Status of the Claims

2. Claims 1-23 have been presented in the application, of which, claim 10 is currently amended, claims 1-2, 4-7, 9, 11 and 13-23 were previously amended, and claims 3, 8, 12 are original. Accordingly, pending claims 1-23 are addressed herein.

3. The applicants' appeal of the office action dated 05 May 2009 is persuasive and, therefore, the finality of that action has been withdrawn.

Response to Arguments

4. In response to the applicants arguments and/or amendments, the rejection of claims 1 and 15 as indefinite under 35 U.S.C. § 112, second paragraph has been withdrawn.

5. The applicants' arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-4, 6, 8-11 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regards to claim 2, the step of "[driving] the arms to take the plate from between the pair of upright support members and back to between the upright support members" renders the claim indefinite because "a single claim which claims both an

apparatus and the method steps of using the apparatus is indefinite" see MPEP 2173.05(p)(II).

In regards to claims 1, 3-4, 6, 8-11 and 13, the claims include the phrase "means for" or "step for". However, each "means for" or "step for" it is modified by some structure, material, or acts recited in the claim. It is unclear whether the recited structure, material, or acts are sufficient for performing the claimed function. Such a sufficient structure, material or acts would preclude application of 35 U.S.C. 112, sixth paragraph.

For example, the claim 1 recitation of a "lift driving means for lifting the horizontal support table vertically" is a means plus function limitation that invokes 35 USC 112, sixth paragraph. The words "lift driving" modify the means plus function limitation. It is unclear whether such a modification sufficient to preclude application of 35 U.S.C. 112, sixth paragraph.

If applicant wishes to have the claims limitation treated under 35 U.S.C. 112, sixth paragraph, applicant is required to amend the claims so that the phrase "means for" or "step for" is clearly not modified by sufficient structure, material, or acts for performing the claimed function.

If applicant does not wish to have the claim limitations treated under 35 U.S.C. 112, sixth paragraph, applicant is required to amend the claims so that they will clearly not be a means (or step) plus function limitation (*e.g.*, deleting the phrase "means for" or "step for"). See MPEP 2181(I)(C).

In regards to claims 11-12, the recitation of the method steps of "placing…" and "calculating…" render the claim indefinite because "a single claim which claims both an apparatus and the method steps of using the apparatus is indefinite" see MPEP 2173.05(p)(II).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 1-2 are rejected under 35 U.S.C. 102(a) as being anticipated by Ito et al. (United States Patent No. US 6,973,370 B2).

10. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Genov et al. (United States Patent No. US 6,489,741 B1).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyle et al. (United States Patent No. 4,746,256).

In regards to claim 1, Boyle et al. teach a transporting apparatus, installed in a given clean environment, for transporting a plate from a predetermined takeoff position

to a processing chamber, comprising: a pair of upright support members (Fig. 12, element 224); at least one horizontal support table (Fig. 12, element 216) liftably cantilevered on the pair of upright support members; lift driving means (Fig. 12, element 232) for lifting the horizontal support table vertically; and a robot (Fig. 12, element 50) placed on the horizontal support table and having horizontally rotating arms (Fig. 6, elements 92, 94, 96 and 98) for taking up and transporting the plate (Fig. 4, element 32).

Boyle et al. does not explicitly teach that the support members stand at a predetermined interval.

However, it would have been obvious to a person having ordinary skill in the art at the time of invention to predetermine a standing interval for the supports. That is, it would have been obvious to the person to determine a spacing of the supports that is large enough that the table with robot will not easily fall over.

In regards to claim 2, Boyle et al. teach the transporting apparatus as applied to claim 1 above.

Boyle et al. does not explicitly teach that the robot drives the horizontally rotating arms to take the plate […] from between the pair of upright support members and back to between the pair of upright support members.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to configure the robot to take the plate from between a pair of upright support members because the applicants' did not disclose that such taking the plate provides an advantage, is used for any particular

purpose, or solves a stated problem. Thus it would have been prima facie obvious to modify the teachings of Boyle et al. to obtain the claimed invention.

In regards to claim 3, Boyle et al. teach the transporting apparatus as applied to claim 2 above, wherein the horizontal support table comprises tilt adjusting means for changing an angle of the robot placed on the horizontal support table with respect to a horizontal plane (Fig. 12, element 226).

13. Claims 1-10, 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (United States Patent No. 6,973,370) in view of Genov et al. (United States Patent No. US 6,489,741 B1).

In regards to claims 1-3, Ito et al. teach a transporting apparatus, installed in a given clean environment, for transporting a plate from a predetermined takeoff position to a processing chamber, comprising: a pair of upright support members (Fig. 3, element 41, *note that the robot is supported by an unnamed upright member disposed between two distinct upright support members 41*); at least one horizontal support table (Fig. 3, element 40) liftably cantilevered on the pair of upright support members; lift driving means for lifting the horizontal support table vertically ("…*a moving platform 40 capable of being vertically moved and rotated about a vertical axis by a driver unit….*"); and a robot (Fig. 3, element A2(A3)) placed on the horizontal support table and having horizontally rotating arms (Fig. 3, element 4A-4C) for taking up and transporting the plate (Fig. 6, elements W1 and/or 70) wherein the robot the robot drives the horizontally rotating arms to take the plate […] from between the pair of upright support members

and back to between the pair of upright support members (Fig. 3, element 42; column 7, line 31-62).

Ito et al. do not teach that the horizontal support table comprises tilt adjusting means for changing an angle of the robot placed on the horizontal support table with respect to a horizontal plane.

Genov et al. teach a robot motion compensation system, the system comprising: a pair of upright support members (Fig. 8, elements 37 and 39); at least one horizontal support table (Fig. 8, element 36) liftably cantilevered on the pair of upright support members; lift driving means (Fig. 8, element 40) for lifting the horizontal support table vertically; a robot (Fig. 8, element 34) placed on the horizontal support table and having horizontally rotating arms for taking up and transporting the plate (Fig. 8, element 32); and a tilt adjusting means comprising a plurality of motors for tilting the table by moving at least one motor (Fig. 8, element 41) at a different angular velocity than one or more other motors (Fig, 8, element 43) thereby changing an angle of the of the robot placed on the horizontal support table with respect to a horizontal plane (Fig. 7).

It would have been obvious to a person having ordinary skill in the art at the time of invention to combine the teachings of Ito et al. with the teachings of Genov et al. That is, it would have been obvious to combine the design taught by Ito et al. with the tilt adjusting means taught by Genov et al. for the purpose of correcting deflection of the robot arm or for correcting geometrical inaccuracies of the robot arm.

In regards to claim 4, Ito et al. teach the transporting apparatus as applied to claim 3 above.

Genov et al. teach that the apparatus as applied to claim 3 above, further comprising: deflection compensating means for compensating a deflected amount in a vertical direction of the rotating arms and a deflected amount of end effectors provided at respective ends of the rotating arms for taking up and transporting the plate (Fig. 8, element 35).

In regards to claim 5, Ito et al. teach the transporting apparatus as applied to claim 4 above.

Genov et al. teach the apparatus as applied to claim 4 above, wherein the deflection compensating means compensates the deflected amounts of said rotating arms and said end effector when the end effectors take up the plate (column 3, lines 24-57; column 5, line 54 through column 6, line 5).

In regards to claim 6, Ito et al. teach the transporting apparatus as applied to claim 5 above.

Genov et al. teach that the apparatus as claimed in claim 5 above, wherein the deflection compensating means comprises an inherent information storing means for storing information indicative of deflected amounts in the vertical direction at a plurality of predetermined measurement points involved in movement of a reference point on one of the rotating arms and the end effectors, and wherein if the reference point moves to one of the measurement points, then the deflection compensating means reads a deflected amount corresponding to a present position from the deflection storing means to compensate the deflected amount (column 3, lines 24-57; column 6, line 34 through column 9, line 2 and column 9, line 51 through column 10, line 22).

In regards to claim 7, Ito et al. teach the transporting apparatus as applied to claim 6 above.

Genov et al. teach the apparatus as applied to claim 6 above, wherein the deflection storing means stores a deflected amount due to a self weight and a deflected amount due to holding of the plate, and the deflected amount due to the self weight and the deflected amount due to holding of the plate are used by said deflection compensating means to change a compensation amount (column 3, lines 24-57; column 9, lines 8-50).

In regards to claim 8, Ito et al. teach the transporting apparatus as applied to claim 4 above.

Genov et al. teach the apparatus as applied to claim 4 above, where wherein the deflection compensating means comprises compensation controlling means for controlling the lift driving means to raise or lower the horizontal support table based on the deflected amount thereby to compensate deflection of one of the rotating arms and the end effectors (column 3, lines 24-57).

In regards to claim 9, Ito et al. teach the transporting apparatus as applied to claim 4 above.

Genov et al. teach the apparatus as applied to claim 4 above, wherein tile deflection compensating means comprises compensation controlling means for controlling the tilt adjusting means to tilt the robot placed on the horizontal support table to one of: raise the end effectors to compensate deflection of one of the rotating arms and the end effectors; lower the end effectors to compensate deflection of one of the

rotating arms and the end effectors; raise the rotating arms to compensate deflection of one of the rotating arms and the end effectors; and lower the rotating arms to comprises deflection of one of the rotating arms and the end effectors (column 3, lines 24-57).

In regards to claim 10, Ito et al. teach the transporting apparatus as applied to claim 4 above.

Genov et al. teach the apparatus as applied to claim 4 above, wherein the deflection compensating means comprises compensation controlling means for controlling the lift driving means and the tilt adjusting means for one of: raising the horizontal support table to compensate deflection of one of the rotating arms and the end effectors; lowering lower the horizontal support table to compensate deflection of one of the rotating arms and the end effectors; and changing the angle of the robot with respect to a horizontal plane by controlling the tilt adjusting means based on the deflected amount to compensate deflection of the rotating arms or the end effectors (column 3, lines 24-57).

In regards to claim 13, Ito et al. teach the transporting apparatus as claimed in claim 1 above, further comprising: moving means (Figs. 3 and 4) for moving the pair of upright support members horizontally (column 7, lines 29-62).

In regards to claim 23, Ito et al. teach the transporting apparatus as applied to claim 1 above wherein the robot comprises an inherent body which is fixed about the vertical axis (e.g. horizontally rotatable using right hand rule) with respect to said horizontal support table, said horizontally rotating arms including an end which is rotatably fixed to said body of said robot (Fig. 3).

14. Claims 1, 11-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Genov et al. (United States Patent No. US 6,489,741 B1) in view of Bacchi et al. (United States Patent No. US 6,275,748 B1).

In regards to claims 1 and 11, Genov et al. teach a transporting apparatus, comprising: a pair of upright support members (Fig. 8, elements 37 and 39); at least one horizontal support table (Fig. 8, element 36) liftably cantilevered on the pair of upright support members; lift driving means (Fig. 8, element 40) for lifting the horizontal support table vertically; and a robot (Fig. 8, element 34) placed on the horizontal support table and having horizontally rotating arms for taking up and transporting the plate (Fig. 8, element 32).

Genov et al. do not explicitly teach a placing position detecting means including a placing position sensor for detecting passage of the plate held by the end effectors; calculating means for calculating a displaced amount of the placing position from the reference point based on a detected signal of the placing position sensor; and displacement compensating means for compensating the displaced amount of the placing position based on the calculated displaced amount.

Bacchi et al. teach a material handling system, comprising: at least one horizontal support table (Fig. 15A, element 309) having a robot mounted thereon, the robot arm including rotating arms for taking up and transporting a plate. The system further including a placing position detecting means including a placing position sensor (Figs 12-14, elements 82, 84, 90, 102, 202, 214) for detecting passage of the plate held by the end effectors; calculating means (Fig. 18B, element 354) for calculating a

displaced amount of the placing position from the reference point based on a detected signal of the placing position sensor; and displacement compensating means (Fig. 18B, element 480) for compensating the displaced amount of the placing position based on the calculated displaced amount.

It would have been obvious to a person having ordinary skill in the art at the time of invention to combine the teachings of Genov et al. and Bacchi et al. That is, it would have been obvious to supplement the robot taught by Genov et al. with the control system taught by Bacchi et al. for the purpose of accurately positioning the robot with respect to a wafer to prevent accidental contact between the robot and the wafer.

In regards to claim 12, Genov et al. teach the transporting apparatus as applied to claim 11 above.

Bacchi et al. teach the apparatus as applied to claim 11 above, wherein the placing position detecting means calculates a displaced amount in an X axis direction, a displaced amount in a Y axis direction and a displaced amount in a rotational direction from the predetermined reference point and the displacement compensating means compensates the displaced amounts by moving the end effectors in such a direction that the calculated displaced amounts are cancelled (column 13, line 66 through column 14, line 9).

In regards to claim 14, Genov et al. teach the transporting apparatus as applied to claim 1 above.

Bacchi et al. teach the apparatus as applied to claim 1 above, further comprising: a beam (Fig. 12, element 234 and 236).

15. Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Genov et al. (United States Patent No. US 6,489,741 B1).

In regards to claims 15 and 20, Genov et al. teach a method comprising: based on position data of accessed position of the rotating arms and the end effectors, calculating a moving amount in a horizontal direction, a moving amount in a vertical direction, and driving data of the rotating arms and the end effectors; moving the robot based on the moving amount in the horizontal direction and the moving amount in the vertical direction and driving the rotating arms and the end effectors based on the driving data; and accommodating deviations associated with deflection of the robot arm (column 1, line 52 through column 2, line 2; column 6, lines 34-54).

While Genov et al. do not explicitly teach "reading from storing means deflection data of the rotating arms and the end effectors which are extended, and compensation data calculated and stored in advance based on the deflected amount and compensating for the deflected amount based on the read compensation data." However, Genov et al. teach a computer readable medium containing a program which is executed to control motor positions in accordance with a current position, a desired position, and an inverse kinematics equation (column 12, lines 1-56).

It would have been obvious to a person having ordinary skill in the art at the time of invention to read the kinematics equation from the computer readable medium for the purpose of execution. Further, it would have been obvious to the person to store the kinematics equation (applicants' "calculated compensation data") prior to execution for

the purpose of accommodating deviations associated with a deflection of the robot arm by executing a program, including said kinematics equation, on a microprocessor.

In regards to claim 16, Bacchi et al. teach the transporting control method as claimed in claim 15, wherein said compensating the deflected amount comprises adjusting a tilt angle of the robot based on the compensation data thereby to compensate the deflected amount (column 14, lines 48-65).

In regards to claim 17, Bacchi et al. teach the transporting control method as claimed in claim 15, wherein said compensating the deflected amount comprises adjusting at least one of the moving amount in the vertical direction and the tilt angle of the robot based on the compensation data thereby to compensate the deflected amount (column 14, lines 48-65).

In regards to claim 18, Bacchi et al. teach the transporting control method as claimed in claim 15, wherein the deflection data read in said reading from said storing means includes deflection data at a plurality of moving points the rotating arms and the end effectors and the calculated compensation data includes compensation data at each of the moving points (Fig. 18A).

In regards to claim 19, Bacchi et al. teach the transporting control method as claimed in claim 18, wherein in said reading from said storing means, the deflection data read from the storing means depends on whether the plate is held (column 14, line 14-20).

It is inherent that the weight of a plate will cause the robot arm to bend. Further, it is inherent that the arm position will differ depending on the weight of the plate.

In regards to claim 21, Bacchi et al. teach the transporting control method as claimed in claim 15, further comprising detecting a placing position of the plate held by the end effectors; comparing the placing position and a predetermined reference placing position to calculate a displaced amount; and performing operational control to compensate the displaced amount (column 14, lines 14-20).

In regards to claim 22, Bacchi et al. teach the transporting control method as claimed in claim 21, wherein the displaced amount in said comparing the placing position and said predetermined reference placing position includes a displaced amount in a X axis direction, a displaced amount in a Y axis direction and a displaced amount in a rotational axis direction from the reference placing position, and wherein the operational control in said performing operational control is performed to compensate each of the displaced amounts in said comparing the placing position and said predetermined reference placing position (column 7, line 49 through column 8, line 18).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dale Moyer whose telephone number is (571)270-7821. The examiner can normally be reached on Monday through Thursday from 10AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi H. Tran can be reached on (571)272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KHOI TRAN/
Supervisory Patent Examiner, Art Unit 3664